

Brookhaven National Laboratory National Synchrotron Light Source		Number: LS-PPS-0009	Revision: B
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Subject: <u>X3A2</u> Radiological Interlock Test			
Prepared/ M. Buckley	Approved By: S.Buda	Revision/Periodic Review Log	

*Approval signatures on file with master copy.

Test Reason:	Test Result: <input type="checkbox"/> Passed <input type="checkbox"/> Failed	
	Test Type: <input type="checkbox"/> Full <input type="checkbox"/> Partial	
Test Date:	Start Time:	Finish Time:
Tester 1:	Assistant 1:	
Tester 2:	Assistant 2:	

PREPARATION:

Inform control room operator that test will be done. _____

Turn off 'Red Tag' switch on x-ray ring interlock, and apply LOTO to X-Ray Security system. _____

Verify that vacuum valves and water interlocks are satisfied on the beam line or connect user interlock test jumper. _____

Request OPCO unlock auxiliary door padlock. _____

1. Search the hutch

The overhead lights go out _____

The red interior light comes on _____

The audible alarm sounds for 13 to 15 seconds minimum _____

The hutch interlock sign turns on _____

2. Open hutch door

The hutch interlock sign goes out _____

3. Press second check station (CS-2).

Nothing happens _____

Press CS-1, exit hutch, close door, press CS-E.

Interlock does not activate _____

4. Press CS-1 and CS-2, close hutch door and wait.

Hutch interior lights come on in not more than 20 seconds _____

Press CS-E.

Interlock does not activate _____

5. Press interior search buttons in order, close door, press CS-E, note that alarm comes on, open and close door, press CS-E again. (This must all be done in less than the timeout interval noted in step 4)

Interlock does not activate _____

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6. Close X3A1 photon shutter and open X3A2 photon shutter. Search X3A2 hutch. One person remains inside. Put hutch key in SRU and turn.

The Safety Shutter "enable" light does not come on until
the end of the warning interval _____

7. The person inside presses an Emergency Stop Button.

The shutter "enable" light goes out
The ES indicator comes on
The ES latch cannot be reset unless
the SOR key is turned _____

ES1	ES2	ES3
_____	_____	_____
_____	_____	_____
_____	_____	_____

8. Place latch device on door lock so key can be removed. Place switch holders on door switches. Search hutch, put door key in SRU and turn, open safety shutter and photon shutter.

The "Beam On" sign turns ON _____

Door:	
1	2

Remove holder from switch 2.

RIB latch light comes on _____

9. Replace holder on switch 2.

RIB cannot be reset unless SOR key is turned. _____

10. Remove holder on switch 1.

Safety shutter closes
Photon shutter closes
RIA latch light comes on
Hutch interlock drops out
"Beam On" sign goes out
RIA can't be reset w/o SOR _____

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

11. Replace holder on switch 1. Search hutch, leave shutter closed.

Hutch Kirk key (KKH) cannot be removed from SRU
unless button is pushed _____

12. Open safety shutter and X3A2 photon shutter.

KKH cannot be removed even if button is pushed _____

13. Close shutters. Turn KKH and note where solenoid unit stops rotation. Push the button and turn key just beyond this point, but not far enough to actuate "key removed" switch. Release the button and leave key in this position. Open shutter(s), remove KKH, and replace.

RIA latch light comes on
RIB latch light comes on
The safety shutter closes
The photon shutter closes _____

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14. With hutch interlocked, leave shutter(s) closed.
 - Beam line transfer key can be removed only if button on SRU is pushed _____
 - Open safety shutter. (Photon shutter remains closed)
 - Beam line transfer key can't be removed even if button is pushed _____
15. Close safety shutter. "Cheat" SRU as described in step 13. Open safety shutter, remove the key and replace.
 - RIA latch light comes on _____
 - RIB latch light comes on _____
 - The safety shutter closes _____
 - SPA comes on _____
 - SPA can't be reset w/o SOR _____
 - Reset RIA and RIB
16. Open photon and safety shutter. Press an emergency stop button.
 - RIA latch light comes on _____
 - RIB latch light comes on _____
 - Hutch interlock drops out _____
 - ES indicator comes on _____
 - Safety Shutter Closes _____
 - Photon Shutter Closes _____
17. Observe the photon shutter while it is opened and closed.
 - The mechanism moves freely and without hesitation _____
18. Open the safety shutter. Remove the Control Room Shutter Enable Key for this beam line, then replace the key.
 - The safety shutter closes _____
 - RIA latch light comes on _____
 - The "Control Room Shutter Enable" light goes out _____
 - The SPA latch comes on (after the key is back on) _____
 - The safety shutter cannot be opened _____
 - Reset RIA and SPA
19. Open the Safety Shutter.
 - Turn "Auto Open" key to "ON".
 - At the Control Room Operator's Console, switch the shutter master enable to "Inhibit" and back to "Enable"
 - The safety shutter closes _____
 - And then re-opens _____
 - Turn "Auto Open" key to "OFF".
 - Switch the master enable to "Inhibit" and back to "Enable"
 - The safety shutter closes _____
 - And does NOT re-open _____

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20. One person goes to the x-ray equipment area and resets the indicators for RIAX and RIBX at SR100.

Open the safety shutter and photon shutter.

Remove switch holder from door switch number 2.

RIB latch light comes on _____

RIBX "Loop Enabled" indicator goes out _____

RIBX "Loop Disabled" indicator comes on _____

Replace switch holder.

RIBX cannot be reset _____

Reset RIB

RIBX CAN be reset

("Loop Enabled" indicator comes on) _____

21. Remove holder from door switch 1.

RIA latch light comes on _____

RIAX "Loop Enabled" indicator goes out _____

RIAX "Loop Disabled" indicator comes on _____

The safety shutter closes _____

The photon shutter closes _____

RIAX cannot be reset _____

Reset RIA

RIAX CAN be reset

("Loop Enabled" indicator comes on) _____

22. Remove the holders from the switches. Remove the latch device from the door locks. Stand inside the hutch and open and close the door.

All door switches operate freely and each makes a "click" when door is opened

(Complete test for each set of door switches)

Door:	
1	2

23. Search the hutch. Locate the safety shutter associated with the beam line by tracing the beam pipe through the shield wall. Do not rely on labels on the shutter mechanism. Open and close the shutter 2 times.

The correct shutter opens _____

No other shutter at that saw tooth opens or attempts to open _____

The mechanism moves freely and without hesitation _____

24. Remove user interlock test jumper (if applicable).

25. Install padlock on auxiliary door _____

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